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10/822,302	04/09/2004	Ansheng Liu	42P14583D	2346

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EXAMINER	
DONG, DALEI	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/822,302	LIU ET AL.	
	Examiner	Art Unit	
	Dalei Dong	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/9/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,343,167 to Scalora in view of U.S. Patent No. 5,801,378 to Hane.

Regarding to claim 1, Scalora discloses in Figure 7, a system comprising: an optical signal source (704); and an integrated circuit (708) operatively coupled (via fiber optic cable 706) to the optical signal source (704).

However, Scalora does not disclose the integrated circuit including a substrate and a plurality of regions formed in the substrate. Hane teaches in Figure 3, an integrated circuit (32) including: a substrate (38); and a plurality of regions (36 or transparent regions) formed in the substrate and having refractive indices (transparent) different from that of the substrate (non-transparent), the plurality of regions and intervening areas of the substrate (38) to form a grating, the grating having a plurality of grating period with substantially constant pitch (P), wherein each grating periods of the plurality of grating periods includes a region of the plurality of regions, the plurality of regions having regions of at least two different width (36-0 is 23P/30; 36-1 is 17P/30; 36-2 is 7P/30 and 36-3 is 13P/30) (see column 8, lines 5-51) for the purpose of achieve a stable sine wave

displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the integrated circuit having plurality of regions of Hane for the system of Scalora in order to achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

Regarding to claim 2, Hane teaches in Figure 3, for each grating period (36-0) of the plurality of grating periods, a grating period (36-1) adjacent to that grating period (36-0) has a region having a width different from the width of that grating period's region (see column 8, lines 4-21).

Regarding to claim 3, Scalora discloses in Figures 4A and 6A, fiber grating with alternating layers of materials or sections having different indices of refraction periodically spaced on a substrate.

Regarding to claim 12, Scalora discloses in Figures 4 and 7, propagating an optical beam (704) through a Xth region (n1) having a first width (a), wherein the plurality of regions are formed in a substrate (406), the substrate (406) having a refractive

index (n2) different from the refractive indices of the plurality of regions (n1), and wherein the plurality of regions and intervening areas of the substrate form a grating.

However, Scalora does not disclose the plurality of grating periods of substantially constant pitch. Hane teaches in Figure 3, the grating having a plurality of grating periods of substantially constant pitch (P), each grating period of the plurality of grating periods including a region of the plurality of regions, the Xth region (36-1) being contained in a Xth grating period of the plurality of grating periods; and propagating the optical beam through a Yth region (36-2) of the plurality of regions, the Yth region having a second width (7P/30) different from the first width (17P/30) and contained in a Yth grating period of the plurality of grating periods, the Yth grating period (36-2) being adjacent toe the Xth grating period (36-1) for the purpose of achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the substrate having plurality of regions with substantially constant pitch of Hane for the system of Scalora in order to achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

Regarding to claim 13, Hane teaches in Figure 3, propagating the optical beam through a Zth region (36-3) of the plurality of regions, the Zth region (36-3) having a third width (13P/30) different from the second width (7P/30) and contained in a Zth grating period of the plurality of grating periods, the Zth grating period (36-3) being adjacent to the second grating period (36-2), the Zth grating period (36-3) being adjacent to the second grating period (36-2), wherein the second width is greater than both the first (17P/30) and third (13P/30) widths.

3. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,343,167 to Scalora in view of U.S. Patent No. 5,801,378 to Hane and in further view of U.S. Patent No. 6,459,533 to Clapp.

Regarding to claim 4, Scalora discloses in Figure 7, a system comprising: an optical signal source (704); and an integrated circuit (708) operatively coupled (via fiber optic cable 706) to the optical signal source (704).

However, Scalora does not disclose the integrated circuit including a substrate and a plurality of regions formed in the substrate and the plurality of regions is formed from ploysilicon and the substrate is formed from crystalline silicone. Hane teaches in Figure 3, an integrated circuit (32) including: a substrate (38); and a plurality of regions (36 or transparent regions) formed in the substrate and having refractive indices (transparent) different from that of the substrate (non-transparent), the plurality of regions and intervening areas of the substrate (38) to form a grating, the grating having a plurality of grating period with substantially constant pitch (P), wherein each grating periods of the

plurality of grating periods includes a region of the plurality of regions, the plurality of regions having regions of at least two different width (36-0 is 23P/30; 36-1 is 17P/30; 36-2 is 7P/30 and 36-3 is 13P/30) (see column 8, lines 5-51) for the purpose of achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

Clapp teaches the plurality of regions are formed from polysilicon and the substrate is formed from crystalline silicone (column 3, lines 16-60) for the purpose of achieving a fast response from the integrated circuit.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the integrated circuit having plurality of regions of Hane for the system of Scalora and construct the plurality of regions from ploysilicon and the substrate from crystalline silicone in accordance to Clapp in order to achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

Regarding to claim 14, Clapp teaches the plurality of regions are formed from polysilicon and the substrate is formed from crystalline silicone (column 3, lines 16-60) and the motivation to combine is the same as above.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,343,167 to Scalora in view of U.S. Patent No. 5,801,378 to Hane and in further view of U.S. Patent No. 6,075,908 to Paniccia.

Regarding to claim 5, Scalora discloses in Figure 7, a system comprising: an optical signal source (704); and an integrated circuit (708) operatively coupled (via fiber optic cable 706) to the optical signal source (704).

However, Scalora does not disclose the integrated circuit including a substrate and a plurality of regions formed in the substrate and the plurality of regions is formed proximate to a buried insulator layer of a silicon-on-insulator (SOI) wafer. Hane teaches in Figure 3, an integrated circuit (32) including: a substrate (38); and a plurality of regions (36 or transparent regions) formed in the substrate and having refractive indices (transparent) different from that of the substrate (non-transparent), the plurality of regions and intervening areas of the substrate (38) to form a grating, the grating having a plurality of grating period with substantially constant pitch (P), wherein each grating periods of the plurality of grating periods includes a region of the plurality of regions, the plurality of regions having regions of at least two different width (36-0 is 23P/30; 36-1 is 17P/30; 36-2 is 7P/30 and 36-3 is 13P/30) (see column 8, lines 5-51) for the purpose of achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

Paniccia teaches in Figure 3, the plurality of regions is formed proximate to a buried insulator layer of a silicon-on-insulator wafer (see column 7, lines 11-26) for the

purpose of increase the modulation depth, and reduce the impact on other optical components in the apparatus.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the plurality of regions or transparent regions of Hane proximate to a buried insulator layer of a silicon-on-insulator wafer of Paniccia and utilize it in the system of Scalora in order to achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings and increase the modulation depth, and reduce the impact on other optical components in the apparatus.

5. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,343,167 to Scalora in view of U.S. Patent No. 5,801,378 to Hane and in further view of U.S. Patent No. 5,195,161 to Adar.

Regarding to claim 6, Scalora discloses in Figure 7, a system comprising: an optical signal source (704); and an integrated circuit (708) operatively coupled (via fiber optic cable 706) to the optical signal source (704).

However, Scalora does not disclose the integrated circuit including a substrate and a plurality of regions formed in the substrate and forming a cladding layer on the substrate and the plurality of regions. Hane teaches in Figure 3, an integrated circuit (32) including: a substrate (38); and a plurality of regions (36 or transparent regions) formed in the substrate and having refractive indices (transparent) different from that of the

substrate (non-transparent), the plurality of regions and intervening areas of the substrate (38) to form a grating, the grating having a plurality of grating period with substantially constant pitch (P), wherein each grating periods of the plurality of grating periods includes a region of the plurality of regions, the plurality of regions having regions of at least two different width (36-0 is 23P/30; 36-1 is 17P/30; 36-2 is 7P/30 and 36-3 is 13P/30) (see column 8, lines 5-51) for the purpose of achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings.

Adar teaches in Figures 2 and 5, a cladding layer (14) on the substrate (11) and the plurality of regions (13) (see column 3, lines 34-65) for the purpose of protecting from impurities and prevents external force from damaging the plurality of regions.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have add a cladding layer of Adar to the substrate or non-transparent region and the plurality of regions or transparent regions of Hane and utilize the waveguide for the system of Scalora in order to achieve a stable sine wave displacement signal with low distortion where the fundamental wave component of the output signal of the displacement signal is independent of the gap between the two diffraction gratings and provide protection from impurities and prevents external force from damaging the plurality of regions.

Regarding to claim 7, Adar teaches in Figures 2 and 5, a rib waveguide (13) is formed in the substrate (11), the rib waveguide containing the plurality of regions and the motivation to combine is the same as above.

Regarding to claim 8, Adar teaches the substrate and the plurality of regions form a Bragg grating and the motivation to combine is the same as above.

Regarding to claim 9, Hane in view of Adar disclose the claimed invention except for the specific claimed ranges of number of Bragg grating and extinction ratio. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have adjust the number of Bragg grating and the extinction ratio in accordance to the design specification, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding to claim 10, Scalora discloses in Figure 8, the waveguide Bragg grating's Bragg wavelength is electronically tunable (see column 11, lines 21-39).

Regarding to claim 11, Scalora discloses in Figure 7, the waveguide Bragg grating's Bragg wavelength is thermally tunable.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of a system.

U.S. Patent No. 5,247,528 to Shinozaki.

U.S. Patent No. 5,751,466 to Dowling.

U.S. Patent No. 5,796,902 to Bhat.

U.S. Patent No. 5,907,427 to Scalora.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571)272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D.D.
January 4, 2005

Joseph Williams
Primary Examiner
Art Unit 2879